Combat Crew

strategic air command

AUGUST 1979

D 301.81:
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"Who's the Flying Safety Officer Here?"

It would seem to be a simple question to answer: "It's Captain Conscience;" or "He's the guy with the nervous flinch;" or "He is the guy who is the mother hen type relating foreboding stories and telling us to fly safely;" or "He's the poor sap who got stuck with the additional duty in the squadron." Those of us with the safety AFSC have probably heard, thought, and yes, even said (before we got this job) those, or similar, comments. Is it that simple? I don't think so. Let's take a look at the safety program and its operation. Maybe it will give us a clue as to who is the Flying Safety Officer around here.

The policy of the United States Air Force Aerospace Safety Program is presented in the AFR 127-13. This regulation provides that the specific objective of the program is:

> ". . . assist each Air Force Commander in carrying out the mission of his organization without accidental injury to or loss of personnel or equipment."

The SAC safety program, known as the SAC Mishap Prevention Program, essentially implements the USAF program through SACR 127-2. This regulation charges commanders with the responsibility of implementing the program and assuming positive leadership in mishap prevention. This would certainly seem to indicate who the Flying Safety Officer is: the Wing Commander.

So that's it. The Wind Commander is the Flying Safety Officer; or IS that as far as it goes? I hope not. If it is, I may have written myself out of a job. Actually there is more. The regulation charges Commanders "at every echelon" with the responsibility for implementing the Mishap Prevention program. So now we can add Deputy Commanders and Squadron Commanders to the list of Flying Safety Officers. Surely that must be it. After all that's a lot of high ranking individuals to be Flying Safety Officers.

Let's look a little closer at the safety program organization to see if anyone else is involved. Three of the major areas in which mishap prevention activities must be directed are (1) investigation and reporting of mishaps; (2) dissemination of mishap prevention information; and (3) Safety Surveillance. By looking at these areas individually, we can see that more people are involved as Flying Safety Officers.

Investigation and reporting involves many individuals as Flying Safety Officers. Since most mishaps are recurrences of a previous mishap, in-depth investigation and meaningful recommendations or "lessons learned" are necessary to preclude recurrence of mishaps. Some of the individuals involved are the Flight Surgeon, maintenance supervisors and specialists, operations types and administrative types. This certainly adds to our list of Flying Safety Officers.

Dissemination of mishap prevention information goes hand in hand with investigation. An in-depth investigation and meaningful recommendations are valueless unless the information is disseminated to the appropriate individuals. The Wing Flying Safety Officer is involved with this as is the additional duty flying safety officer. Supervisors are also charged with the responsibility to be sure the "word" gets out.

D 301.81 : 29/8

In the area of Safety Surveillance (Inspections) several additional individuals are involved. The surveillance program runs the gamut from IG inspections to staff assistance visits to self inspections and supervisor inspections. The purpose of these inspections is to assure an effective safety program and provide a safe environment to work in.

When we recap these areas we see that we can add Wing Flying Safety Officer, additional duty flying safety officer, supervisors, and middle managers to our list of Flying Safety Officers.

It would appear that I have quite an extensive list of Flying Safety Officers from the Wing Commander to supervisors. I did leave one category out, however. It's one of the most important categories and that's why I left it for last. That category is YOU the crew member. Let's face it, the most perfect safety program will be ineffective unless it is applied. The most detailed investigations and meaningful recommendations will be wasted if the information is not utilized. Dissemination of mishap information will be useless if the lessons learned are not integrated into our daily flying activities. If you look back to the USAF program objectives I'm sure you'll agree that we all have a similar objective in mind when we fly. As crew members, you have an extremely important role in the effectiveness of any flying safety program. To our list of Flying Safety Officers we must add Crew Members.

When we take a superficial look at who is the Flying Safety Officer, it seems easy. There is usually one, or maybe two individuals assigned as the Wing Flying Safety Officer. However, the bottom line is that everyone around here is a Flying Safety Officer.

— Capt Jack Adler, 22 BMW Wing.

Combat Crew

Magazine of the Strategic Air Command - 30th Year of Publication

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IN THIS ISSUE

Red Flag 4
Nellis Profile 8
Cold Seat Swap 10
Big Instrument 14
Ops Update 16
RECCE 18
CFIC Corner 20
ACE Topics 22

ON OUR COVER

Refuel the fighter — just one of our KC-135 jobs. In this issue on page 4, read more about the task and SAC's part in "Operation Red Flag."

SACRP 127-1 **VOL. XXIX NO. 8** **August 1979**

COMBAT CREW is an internal publication of the Strategic Air Command with the sole purpose of promoting safety. The contents of this magazine are informative and not to be considered as directive in nature. Facts, testimony and conclusions of all mishaps printed herein may not be construed as incrimination under Article 31 of the Uniform Code of Military Justice. All names, dates and places used in conjunction with mishap stories are fictitous. Written permission must be obtained from Headquarters, Strategic Air Command, before any material may be reprinted by other than U.S. Air Force organizations. Use of funds for printing this publication has been approved by Hq. USAF. Distribution FX, controlled by IGFC. SAC units submit distribution requests through local PDO.

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"JOCKO 73 cleared into Caliente. Contact LA Center on exit, cleared tactical." For the next two hours, Jocko 73, a SAC KC-135, will be in the combat zone known as . . .

RED FLAG

Maj Terrence L. Dillon
32d AREFS, Rickenbacker AFB

Recently, the 301st Air Refueling Wing, Rickenbacker AFB, participated in Red Flag 79 by conducting a mobility deployment to March AFB.

During mobilization, aircrews and support personnel were recalled to duty, a mobility processing line was established, and aircraft were readied. The 301st AREFW had been tasked to deploy five KC-135 tankers, five aircrews, 70 maintenance personnel, an ops staff, two spare engines and associated support equipment. Unlike other mobilization exercises held in the past, Red Flag 79-4 would go a step further — personnel would actually deploy for 30 days.

Timing was critical. Aircraft were scheduled to launch at 30-minute intervals so as to arrive at March at specified times. The first aircraft carried the maintenance contingent. The last aircraft was loaded with the two spare engines and a limited supply of spare parts.

Now, the scenario becomes even more real when you review your emergency data card and receive your pay in cash! In one hour and 30 minutes, your aircraft will roll down the runway and depart for an unknown environment. You ponder unanswered questions:

What am I really going to do when I arrive? What type missions will I fly? Apprehensive? Yes!

You are leaving the comfort and familiarity of the home drome for entirely new surroundings. Without answers, the mind can focus on only one thought — Red Flag, Red FLAG, RED FLAG.

For the 301st, Red Flag was a unit move. Each tanker contingent was expected to operate as a self-contained unit. The total tanker task force consisted of approximately 100 personnel. The host unit at March, the 22nd Bomb Wing, provided billets, parking space, jet fuel, and limited administrative support. The 301st was responsible for the launch, recovery, maintenance, scheduling, and coordination of its own resources.

Since the Nellis tactical range opens at sunrise, the 301st crew day started early. The one hour flight to the air refueling tracks near Nellis required predawn bus times to meet the 0530-0630 hour takeoff times. Takeoffs were planned with a 150,000 pound fuel load and water augmentation. Each Red Flag mission, being higher headquarters directed, is executed by 15th Air Force. When early morning fog was present, pilots expected 15th Air Force to approve takeoffs with runway visual range (RVR) as low as 1000 feet.

For departure all tankers plan to fly the Skylark SID. Tankers going to eastern air refueling tracks use the Thermal transition. Tankers going to AR 625 fly the Oceanside transition. (Fig 1) Los Angeles ARTCC does not permit use of the Palmdale transition.

On recovery, missions returning from the east plan an enroute penetration from Thermal VORTAC. Those sorties returning from AR 625 plan a descent through HITOP intersection found on the enroute low altitude charts in FLIP.

Three to five air refueling sorties are scheduled daily, Monday through Friday. The daily air tasking order (frag) is received 24 hours in advance and assigns each sortie to one of five air refueling tracks which ring the Nellis range: AR 317, AR 625, AR 635, Red Flag Anchor, and Brown Anchor. Brown Anchor is seldom used, and then only when the Hill-Dugway complex is open. Additionally, the frag order provides offload, type receivers, receiver call signs, IFF/SIF codes, and a 30-minute ARCT window. This 30-minute ARCT window allows the fighters to adjust the ARCT to accommodate their target times and tactics for that day. Final ARCT's are coordinated the morning of launch. This final adjustment of ARCT's sometimes requires tankers to a shift takeoff times plus/minus 15 minutes.

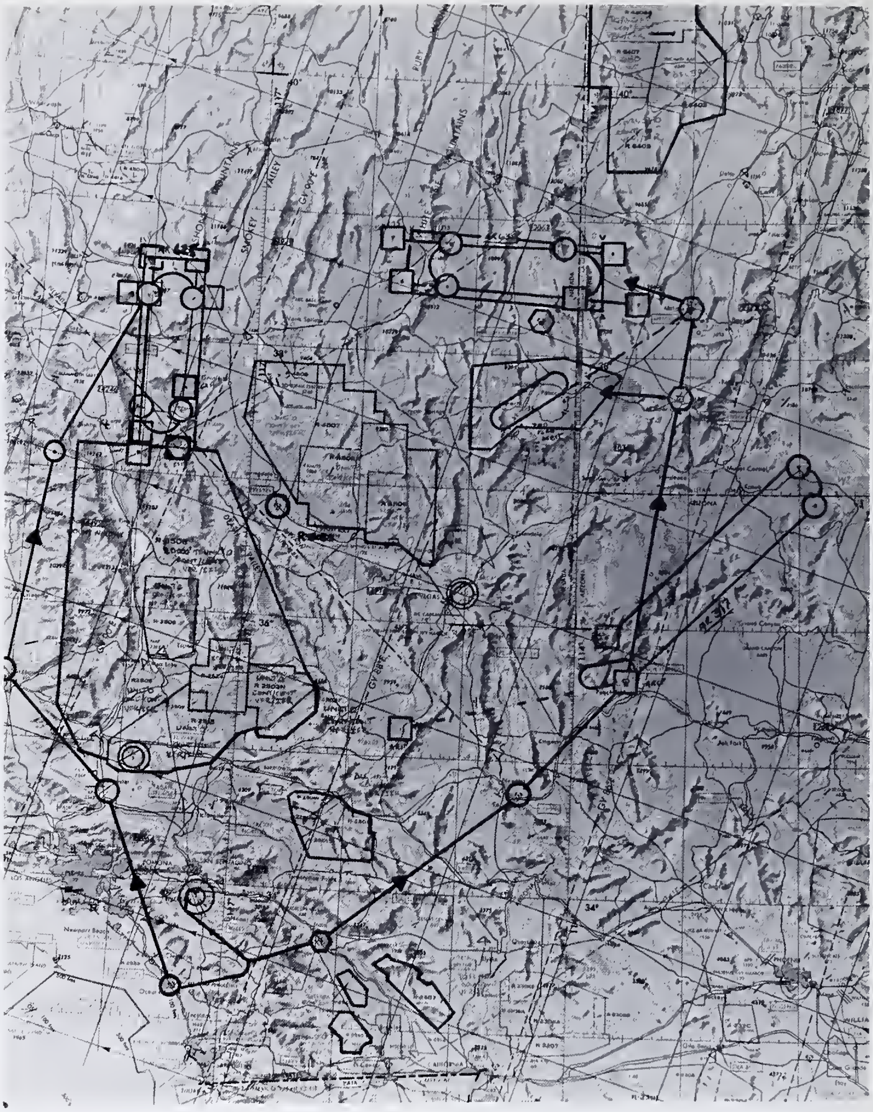


FIGURE 1

The FLIP published air refueling tracks present no special problems. These tracks require only normal air refueling clearance and coordination with the controlling ARTCC. Tankers normally fly published tracks with only a single set of receivers. Anchor refueling, on the other hand, can require the tanker to remain on station for as long as two hours to refuel several receivers. There might be different types of receivers or prestrike and poststrike refueling of the same receiver flight. Offloads for all tracks range from 40,000 to 60,000 pounds. Tanker BINGO fuel of 30,000 pounds enables return from any air refueling track to March with a 20,000 fuel reserve.

The real combat arena is Red Flag Anchor. (Fig 2) This airspace, commonly called Caliente, is located in the northwest corner of the Nellis range. As in any combat theater, this arena has its own special rules of engagement.

Rule No. 1. Red Flag Anchor is only a small part of the Caliente airspace — that portion allocated for KC-135 refueling operations. Other activity in Caliente includes ECM and fighter activity below 12,500 feet, and U.S. Navy KC-130 refueling at 15,000 feet. KC-135 refueling of USAF aircraft in Red Flag Anchor is normally conducted at FL 210 and FL 250 in two-hour time blocks. Crews must know their assigned entry and exit times. Early entry is not authorized.

Rule No. 2. Tankers may enter Red Flag Anchor from Cedar City, Milford, or Wilson Creek VORTACs. Prior to entry, the aircrew must contact range control and request clearance to enter Caliente. During the pretakeoff briefing, each sortie will be given special IFF/SIF Mode II and Mode III codes. These codes must be set prior to entry. The special IFF/SIF codes identify you as a tanker and permit range controllers to monitor tanker position.

Rule No. 3. There is no GCI. Tankers entering Red Flag Anchor are operating on a "tactical clearance" from Los Angeles ARTCC. Altitude separation is not guaranteed by radar monitor. The entire Caliente airspace is considered VFR from ground level up to 50,000 feet. Crews are permitted to

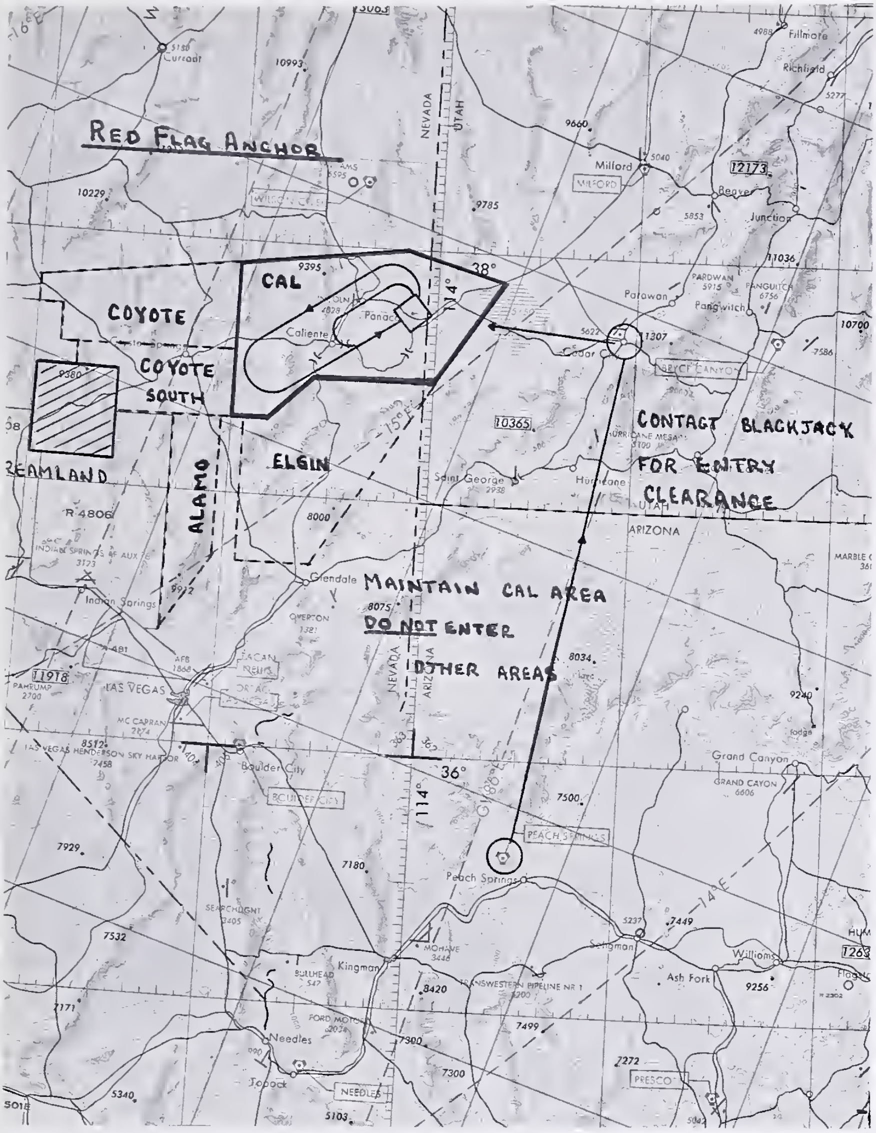


FIGURE 2

change assigned refueling altitudes to accommodate fighter requests and weather conditions. However, range controllers must be advised of all altitude changes before they are made. In this regard, all tanker crews scheduled into Red Flag Anchor must be aware of other scheduled air refueling times and altitudes within the Caliente airspace. If two tankers are in Caliente at the same time, air refueling altitude changes should be coordinated inflight between the individual tankers.

Rule No. 4. Tankers must stay within the confines of the Caliente airspace. There are numerous special use areas and military operating areas (MOA) surrounding Caliente. Tankers may not enter Coyote, Coyote South, Elgin, or Alamo. Tankers are responsible for maintaining their own orbit within the assigned airspace. There are no ground based radars to assist. When refueling in VMC conditions, it is best to let the fighters make a visual rendezvous. You can expect to be refueling a set of F-4s. If in IFC conditions, have the second set of receivers wait at the IP until the first set has completed refueling.

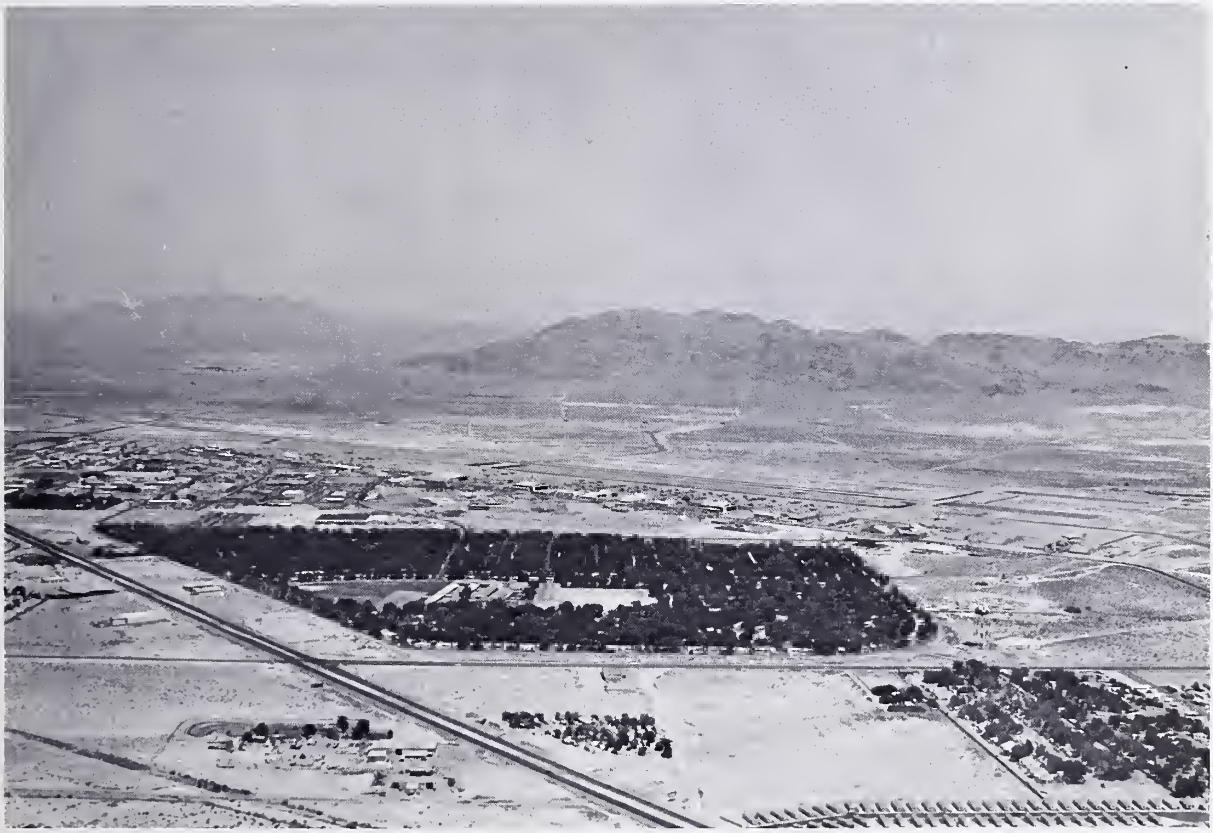
Rule No. 5. Adaptability is the key to success. Be ready to adapt to a fast moving situation. Adaptability, however, must incorporate good procedural knowledge, common sense, sound air judgment, and an intuition for what needs to be accomplished. But beware, flexibility must never compromise flying safety.

Red Flag is a great experience for a refueling squadron. First, Red Flag proves that a tanker squadron can move and function as an independent unit. Given a runway and fuel supplies, a single tanker squadron can establish its own tanker task force. Secondly, the flying experience in a near combat environment is extremely realistic. Crews gain increased confidence in the aircraft and in their own capabilities. Lastly, Red Flag forces a unit to draw from within. It motivates all personnel, crews and staff, toward a common goal. Esprit de corps and morale are high.

Red Flag finally challenged the 301st crew and will challenge your professional capabilities. Remember the rules of engagement, be flexible, and be safe.

FOR THOSE RED FLAG BOUND, A LOOK AT THE . . .

Nellis Airfield Profile



This aerial view of the Nellis runway system, from a west-downwind, highlights the close proximity of Sunrise Mountain. Sunrise, which stands at over 4050 ft MSL, is located less than three miles from the airfield boundary, and severely restricts traffic patterns east of Nellis. US Air Force Photo by A1C Daniel Wason, Courtesy of Red Flag Rescue.

Lt Ben Rich
2069 Comm Sq., Nellis AFB

Located deep in the Las Vegas valley, Nellis AFB, serves as home of the 4440th Tactical Fighter Training Group (Red Flag). The base is situated six miles northeast of Las Vegas, just off Interstate 15.

Nellis is unique when compared to other bases. Approximately 180 high-performance aircraft fly in and out of Nellis and make the Nevada skies some of the busiest in the world. During a Red Flag exercise, which adds an additional 60-80 aircraft of various types, it is not unusual for Nellis to generate over 300 sorties per day.

Nellis also possesses several unique aspects of which the visiting pilot should be aware. Because of

Continued on Page 12

COLD SEAT SWAP

Capt William J. Evans
325th Bomb Sq.

Your crew is set for a 1300 launch on a five-hour afternoon sortie under the new Cold Seat Swap (CSS) program. You are scheduled for air refueling, a Defense Coordination Exercise, a low level navigation and bombing exercise, a system operation exercise for the navigator, and then back to the local pattern for transition. A fairly easy afternoon — if you're accustomed to flying a 10-hour marathon.

You all arrive promptly at 0830, four and one-half hours prior to your scheduled launch time, just like you're supposed to. You know you can't do anything without your morning cup of coffee and of course you have to stop by the Operations Office to hear the latest. Now it's 0900 and time for target study. The pilot, copilot, radar navigator, and navigator are briefed by Bomb/Nav on the bomb runs they are making today. After the target study officer has brought you up to date on the latest navigator information, you decide to review the low level route.

Since this is a "canned" mission, most of the paperwork is already completed and there is no rush for time. There is time for another cup of coffee before the copilot figures his takeoff data and you finish the forms. The radar and navigator return and you brief prior to a 1030 bus. Is it really after 1000?

You really have plenty of time at base operations so you can cover the crew coordination items there. While at base operations getting your weather briefing you suddenly realize a few extra people have slipped in to listen to the briefing. Is it really time for another no-notice? Is the crew prepared to fly?

The CSS program is highly event oriented and requires thorough planning ahead of time. There was a certain luxury built into our old mode of operation that is hard to appreciate unless you have tried to cram eight hours of mission planning into two hours.

First, mission planning day always allowed plenty of time to accomplish all those necessary things that somehow never got accomplished any other time. There was always plenty of time for checklist changes, manual changes, additional duties, or just hearing the latest news while drinking coffee with the other crews.

Second, a good navigator had the flight plan done and a good copilot had the fuel curve completed before mission planning started. That meant you could brief early. Then the crew could spend extra time reviewing crew coordination items.

Finally, there was no time limit on your crew briefing. If you felt that it was necessary to cover certain areas in detail, there was plenty of time to do so. The current stan/eval hot items could be covered thoroughly.

The CSS program does not allow us this luxury. It is a program designed to get crews into the air more often. Each mission-ready crew now flies 12 sorties per quarter. The profile training sorties are approximately seven hours duration and still allow an entire day for mission planning. The pilots get one pilot proficiency sortie, while the remaining seven sorties are event oriented and at least five of these must include a low level navigation and bombing exercise.

These event oriented sorties are the key to the CSS program. Each day one crew and aircraft are designated as the primary CSS sortie and another crew and aircraft is designated as the backup. The primary CSS crew flies a five hour morning mission and if the primary aircraft can be maintenance turned, then the afternoon CSS crew takes the aircraft and flies another five hour mission. If the primary aircraft has maintenance difficulty which precludes it from flying, then the afternoon crew uses the backup aircraft. That way the aircraft still flies for 10 hours and two crews get complete missions out of it.

The morning sortie is similar to the longer sorties we used to fly. Although there are no double race tracks, no high bomb runs, and no celestial navigation legs, they do provide five hours of intense and varied activity for most of the crew. Mission planning is reduced to a half-day with the aid of "canned" mission materials. If you need to spend more time mission planning, it is available.

The afternoon sortie is somewhat more challenging. First, your show time is four and a half hours prior to your scheduled takeoff time and there is little time available for mission planning. While most of the paperwork is already completed, the crew still has to fill out some forms themselves. This paperwork, along with the required target study and crew briefing, leaves little time for reviewing crew coordination items.

What can you do to make the flight smoother and safer? There seems to be at least three things that are actually building better, more closely coordinated crews.

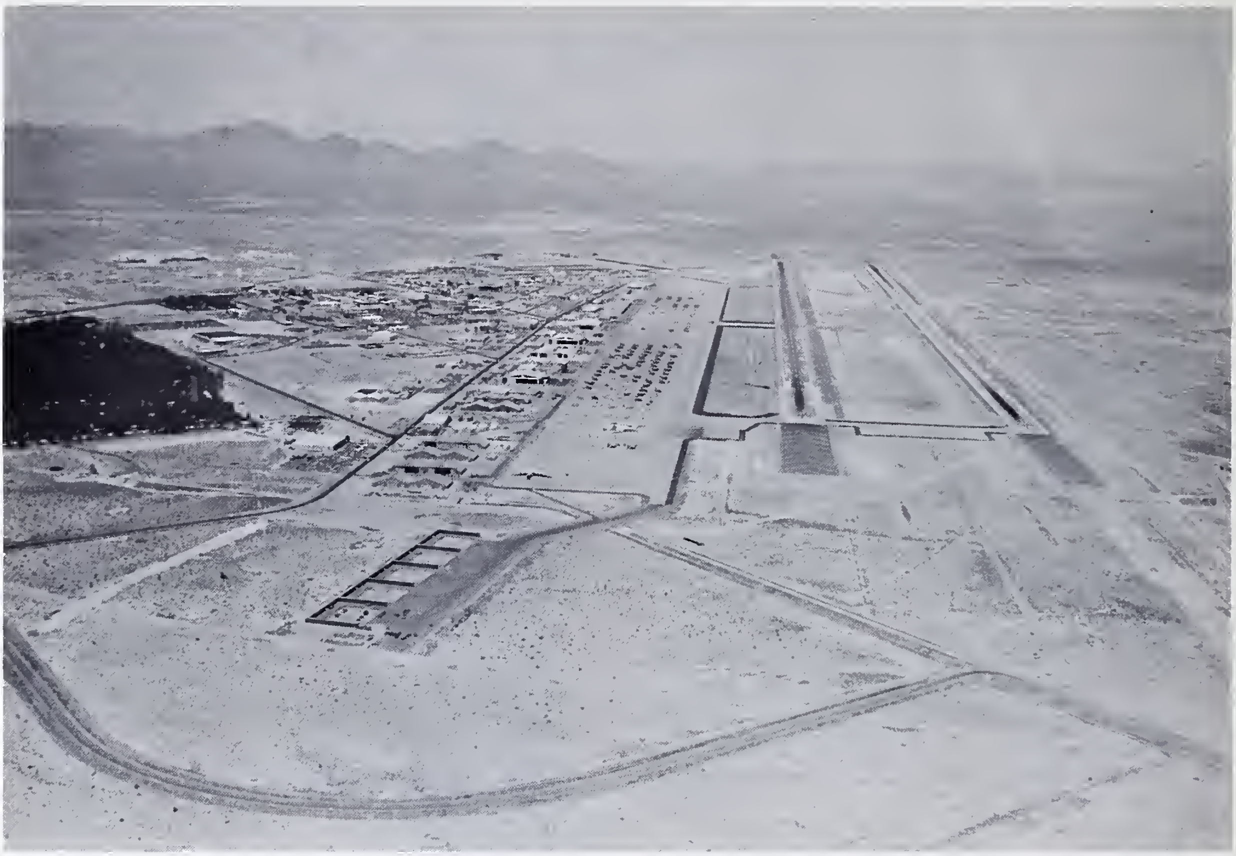
Hangar flying has probably been discussed and promoted as much as any single idea in flying. Certain activities we accomplish do not change much from one flight to the next. For instance, certain checklist items might change, but not the actual checklists themselves. The procedures remain constant. These are the areas that time spent discussing during an alert tour will result in smoother inflight crew coordination. The bombing system check, the terrain avoidance functional check, the DCE, and air refueling rendezvous procedures all remain about the same. Discussing these ahead of time will save time on mission planning day.

The second thing that can help is to build good habit patterns. While individual techniques will vary, crews that have flown together more than a couple of times get an idea of how everyone works. If you plan and then fly the same way every time, it takes the guess work out of who is going to accomplish which checklist where. When things don't work out just as you had planned, it is habit patterns that will help you do the proper thing. For example, the copilot who never remembers a station check on a normal crew sortie, will forget other items on a check ride trying to remember station checks. Or the navigator who habitually forgets to check his oxygen panel and then on a check ride is distracted by a mission change and does not have the established habit to rely upon.

The third item is not to allow your crew to become complacent about mission planning. Especially for a CSS sortie, get the mission planning done early and allow yourself some time later on. If something unexpected does arise then at least you have allowed yourself time to handle it. Make sure your crew uses available mission planning time productively. This provides the opportunity to review all checklists and crew coordination items on a CSS sortie.

Even though the CSS program generally means shorter sorties, that does not necessarily mean an easier work day. Crews are expected to use these sorties to gain maximum training, and increase new coordination.

Continued from Page 9



The Nellis AFB Runways, as seen from a one-mile initial to RWY 03, provide the pilot with 10,000 feet plus of concrete to operate on. Pilots can expect traffic patterns to the west because of the close proximity of mountains to the east. US Air Force Photo by A1C Daniel Wason, Courtesy of Red Flag Rescue.

airspace restrictions, arrivals and departures normally utilize Runway 21. During VMC, Runway 21 departures will expedite a climb to maintain 2500-3000 ft MSL until turning out of traffic at the south end of the base golf course. Runway 03 becomes the primary runway in the morning (avoiding the noise problem over North Las Vegas). Additionally, aircraft with live ordnance are always required to depart Runway 03. This requirement for opposite direction operations necessitates that flight crews exercise close attention to air traffic control instructions provided by the Nellis Control Tower and Ground Controlled Approach. Approach control to Nellis is provided by the FAA at the McCarran International Airport, which serves the greater Las Vegas area.

Nellis utilizes two 10,000 ft parallel runways, 1,000 feet apart. Each runway is served by a full complement of BAK-12, BAK-9, and Modified MA-1A arresting systems. Due to the location of Sunrise and Frenchman Mountains, less than four miles southeast of the base, all high-performance aircraft can expect traffic patterns to the west.

Aircraft based at Nellis fly the VFR initial at 3,500 ft MSL and 300 knots. F-105s fly slightly faster, while the A-10s fly a slower tighter pattern. With the variety of aircraft at Nellis, pilots must pay close attention in order to avoid overtaking the preceding aircraft in the pattern.

Located adjacent to the base proper, and slightly to the east of the extended centerline of Runway 03R is the Lake Mead Base, or Area II. Aircraft are restricted from overflying this facility.

To say air traffic in the Las Vegas area is heavy is an understatement. The McCarran International Airport is constantly busy, and its location 10 miles south of Nellis restricts the use of Runway 03 for instrument approaches. The North Las Vegas Air Terminal, a civilian airport seven miles to the west, generates over 200,000 operations per year. This

AT DECISION HEIGHT: Nellis arrivals are served by both TACAN and PAR approaches to both RWY 21 and RWY 03. However, instrument approaches to Runway 03 during VMC are very limited because of the conflict with arrivals and departures at McCarran International Airport located 10 miles south of Nellis. US Air Force Photo by A1C Daniel Wason, Courtesy of Red Flag Rescue.

traffic consists mainly of small, civilian aircraft, which fly basically in VMC. The traffic pattern at Nellis can become completely saturated during a Red Flag recovery. It is not unusual for 60 aircraft to recover at Nellis during a 15-minute period.

Nellis is served by a full complement of instrument approaches and departures. Pilots who request instrument approaches to Runway 03 during VMC can expect extensive delays due to the necessity of mixing the Nellis and McCarran arrivals. Pilots who file for Standard Instrument Departures (SIDs), as the first leg of their departure from Nellis should be aware of the steep climb requirements needed to clear surrounding terrain and avoid noise sensitive areas.

Because of the scarcity of quarters, only personnel on official orders (flight crews on per diem) can be processed by the billeting office. Contract quarters downtown are used when base quarters are not available. Information on availability and reservations can be obtained at AV682-2710. Space available quarters are nonexistent, and adequate quarters downtown can exceed $40.00 per night.

The Officers' Club is open for all meals Monday-Friday, and breakfast on Saturdays. The base dining halls are available when the Officers' Club is not serving meals. Relatively inexpensive buffets are available in many of Las Vegas' hotels.

What can you say about Las Vegas that has not already been said? A full variety of entertainment and sports is available, which is sure to please all. Keep in mind that quarters arrangements should be made prior to arrival.

All participants of Red Flag who visit Nellis are treated to the unlimited visibility and the breathtaking landscape of the Nevada countryside and some of the most fantastic flying in the world. However, pilots who operate through the area must do so with a "heads up-eyes open" posture.

BIG INSTRUMENT

Compensating for Winds

Captain Tome H. Walters, Jr.
Instrument Division
1st Combat Evaluation Group
Barksdale Air Force Base, Louisiana

SITUATION: A KC-135 crew at a northern base was being vectored for a PAR touch and go. Computed final approach speed was 145 KIAS. Surface winds were reported as a 20 knot direct headwind (no gust). The PAR has a 2.5° glide slope.

The pilot briefed 730 feet per minute rate of descent. At start descent, he set flaps, reduced power, and established 700 ft/min on the VVI. Indicated airspeed began decreasing and the aircraft went well below glide slope. The pilot added power and increased the pitch. The aircraft stabilized on the glide slope with an unusually high power setting and the VVI reading 450 ft/min.

QUESTION: 1 — What would you suspect at this point? (Clue — aircraft pitch, power, and configuration were correct.) 2 — What changes in pitch and power would you anticipate prior to landing?

DISCUSSION: Take half credit if you answered "Wind Shear" to question one. That is certainly a *possibility* at this point. Abnormal pitch and power settings, with an unusually steep or shallow descent rate, should key a pilot to be alert for *potential* wind shear.

When we talk about wind shear, we usually think of a sudden change — dropping a chunk of airspeed in the snap of a finger. At this point, we don't know if a shear exists or not.

If your answer to question one was a "decreasing headwind", go to the head of the CIF. We obviously have a strong headwind. It might decrease suddenly or gradually.

The answer to question two is a power reduction and decreasing pitch as the headwind decreases.

The situation is not academic. It happened to a young aircraft commander with a CEVG evaluator in the jump seat. He handled it well, and, yes, he passed. A good crosscheck certainly helped. The pilot was not aware of the decreasing headwind. Had he been, it would have eased his workload considerably. The world's best crosscheck won't tell a B-52 or a KC-135 pilot what the ground speed is. But a navigator can. The purpose of this article is to point out to both pilots and navigators that ground speed is important and show how to use it in this situation.

What does ground speed mean to the pilot? How do you use it? To answer these questions, look at figure one.

In our case, indicated airspeed at glide slope intercept was 145. But ground speed, from the doppler, read 90 knots! The headwind at that point was 55 knots. But remember the surface winds were 20 knots. By comparing the two winds, the pilot can note the headwind drops off 35 knots from start descent to touchdown. That comparison tells you what type of situation you're facing — an increasing headwind or a decreasing headwind. It also tells you the magnitude of the change.

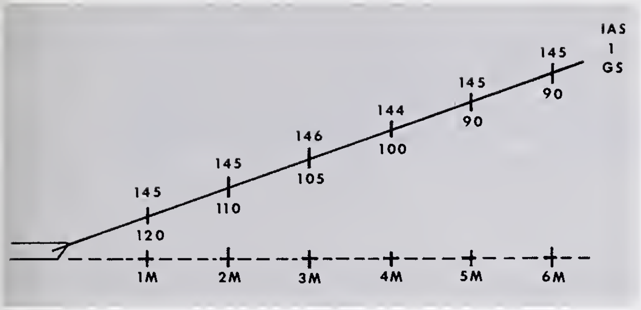
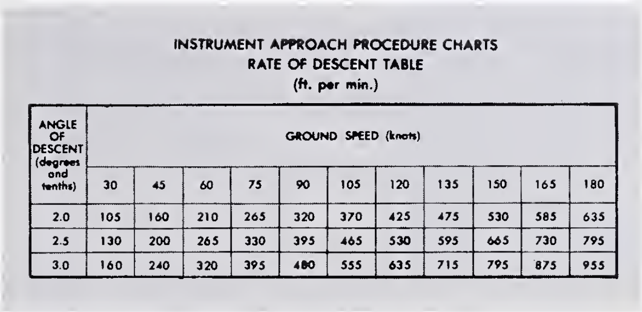


FIGURE 1



INSTRUMENT APPROACH PROCEDURE CHARTS
RATE OF DESCENT TABLE
(ft. per min.)

ANGLE OF DESCENT (degrees and tenths)	GROUND SPEED (knots)										
	30	45	60	75	90	105	120	135	150	165	180
2.0	105	160	210	265	320	370	425	475	530	585	635
2.5	130	200	265	330	395	465	530	595	665	730	795
3.0	160	240	320	395	480	555	635	715	795	875	955

FIGURE 2

The pilot first uses the ground speed to determine the actual rate of descent required. Look at figure two. In our case, the pilot had briefed 730 ft/min by mistake. At 145 KIAS, 650 ft/min is the correct number. But the ground speed of 90 knots called for 395 ft/min. Quite a difference!

Knowing the ground speed, along with the indicated airspeed, and the surface winds, gives the pilot the chance to get mentally ahead of the aircraft. Being ready and anticipating what should happen next is a lot easier than reacting to the unexpected.

The techniques for coping with a decreasing headwind (or an increasing headwind) are explained in the 135 flight manual under "Wind Shear." The same information will be included in the next change to each of the B-52 flight manuals: change 16 for the D model, change 19 for the G, and change 18 for the H.

These techniques are applicable to the gradual decreasing headwind or to the sudden decreasing headwind associated with a shear. While few of us have experienced a sudden, severe shear, all of us have experienced the effects of an increasing or decreasing wind (whether we knew it or not). The essential difference is how fast the change takes place. Understanding how to handle either situation makes it easier to understand the other.

The current dopplers on both the B-52 and the 135 provide accurate ground speed information down to about 300-500 feet above the ground, depending on the terrain. The new solid state dopplers and the INS will give more useful wind and ground speed information throughout a wider range. When the INS/DNS is installed on the 135, the pilot's display unit will be located where the copilot's radar scope is currently located. Ground speed information will then be directly available to the copilot.

Recommended Techniques

Pilot — 1 – Note the surface winds when you receive the destination weather. 2 – Brief the target rate of descent for the approach, based on planned indicated airspeed. 3 – Compare indicated and ground speeds inbound to the final approach fix or immediately upon starting descent. 4 – Make the required interphone call descending to decision height or minimum descent altitude (N/A PAR). 5 – Adjust the target VVI based on the actual ground speed. 6 – Be prepared to adjust pitch and power as the winds change during the approach.

Navigator — 1 – Note the surface winds when you receive the destination weather. 2 – Note and crosscheck the rate of descent the pilot briefs for the planned indicated final approach speed. 3 – Inbound to the final approach fix, note the winds and compare indicated and ground speeds. 4 – When the pilot calls "Descending to (DH/MDA)", respond with the ground speed. 5 – Crosscheck the rate of descent table in the approach book for the actual ground speed. 6 – Advise the pilot if the required descent rate differs from the briefed by more than 100 ft/min. 7 – Monitor ground speed and let the pilot know if it changes by 10 knots or more.

You might select other parameters in place of 100 ft/min and 10 knots. We encourage you to adapt the recommended techniques as you think helpful and appropriate.

Navigators often ask what they can do to help the pilot in the traffic pattern. Providing ground speed on final is a simple, useful example of pilot-nav crossflow. Knowing how to use the information is the difference between a stabilized approach and checking the limits on the PAR scope.

If you have any questions or comments, give us a call — Autovon 781-3648 — or drop us a line — 1CEVG/STI, Barksdale AFB LA 71110. We look forward to hearing from you.

OPS—UP-DATE

HQ SAC DCS/OPS

MAJOR GENERAL JACK L. WATKINS

DIRECTORATE OF COMMAND CONTROL, SPACE AND SURVEILLANCE– COLONEL CLARENCE R. AUTERY

UK TANKER FORCE. Under a joint United States/Great Britain agreement, RAF Fairford, in the United Kingdom, is scheduled to begin SAC operations in September 1979, with the arrival of five KC-135 aircraft. These five are the first of 15 tankers that will support European Air Refueling Operations on a TDY basis. (Capt Robert Dade, DOCFU)

DIRECTORATE OF MISSILE OPERATIONS–COLONEL JOE L. CHURCH

MINUTEMAN CARTRIDGE TAPE READER (CTU) PROGRAM. Design of a new data input processor for the Minuteman weapon system is complete. The CTU will permit mylar-to-magnetic conversion of tapes currently used to input launch, execution, and related data into missile guidance computers. It is designed to improve alert readiness, enhance security, and simplify computer loading procedures. Testing of the CTU will begin this summer with full integration projected for 1981. (Capt Peter J. Engstrom, DOMC)

MINUTEMAN IMPROVED LAUNCH CONTROL SYSTEM (ILCS) MODIFICATION. The WS-133A-M Minuteman weapon system at Whiteman AFB MO is undergoing modification. The Improved Launch Control System (ILCS) modification upgrades launcher blast, shock, electromagnetic, and radiation survivability. Additionally, command and control modifications will provide secure selective enable, encrypted communications between the launch facilities and the launch control centers, and ALCC hold-off command capabilities. Improved maintainability will be gained through a data collection system that will permit identification of guidance system degradation. Three squadrons at Malmstrom AFB MT have already completed the ILCS modification and Whiteman AFB should be completed in early 1980. The ILCS modification will complete an extensive modification program throughout Minuteman to insure survivability and flexibility of the missile system into the 1980s. (Major Ronald L. Walker, DOMC)

DIRECTORATE OF STRATEGIC RECONNAISSANCE CENTER–COLONEL HARLON A. HAIN

OPS NORMAL — VIA SATELLITE. When Capt J. M. Gregory, a navigator of the 6th Strat Wing flying in an RC-135 out of Shemya AB, Alaska, pushed the "transmit" button on his newly acquired AFSATCOM terminal, his "ops normal" travelled via UHF over 40,000 miles into space and back. As Airman First Class McGhee and Staff Sergeant Peterson of the 1st Aerospace Comm Gp at the Offutt AFB AFSATCOM terminal read out this short, but important message, they were looking at the first operational command/control traffic to be passed by a SAC combat crew via the AF Satellite Communication System. Upon relay of this traffic to the Strategic Reconnaissance Center, it was logged and presented to the SAC/DO who was in the center attending a meeting with recce wing commanders. The entire process from aircraft to SRC took less than one minute and represents a significant milestone in the evolution of worldwide command control communications via satellite. (Lt Col Bob King, DORC)

DIRECTORATE OF BOMBER OPERATIONS–COLONEL GEORGE P. TYNAN

BULLET BLITZ. On 1 August, a crew from the 410 BMW, K I Sawyer AFB, will launch the last SRAM in the current series of BULLET BLITZ live test launches. The B-52H crew will program the missile to fly a semiballistic profile to a target on the White Sands Missile Range NM. The 410 BMW/MMS and 2 MMS Non-Tactical Instrumentation Team will configure the SRAM with an Operational Test Launch (OTL) payload. The OTL payload contains a beacon transponder to permit missile tracking by ground radar, a telemetry package for transmission of missile performance data, and a command/destruct capability for range safety purposes. Plattsburgh and Pease AFBs are preparing for their SRAM Alternate Launch (SAL) captive-carry missions on 15 and 29 August, respectively. The SAL capability allows FB-111 crews to launch a SRAM if the aircraft's inertial navigation system is degraded or inoperative. (Capt Steve Leonard, DOOV)

BUSY LUGGAGE. The 28 BMW, Ellsworth AFB SD, will conduct a BUSY LUGGAGE flight test mission on 8 August 1979. During the mission, the fifth of six missions planned for this year, two inert test weapons and two drop shapes will be released from low altitude on the Tonopah Test Range, Nevada. Release of inert test weapons verifies the capability of SAC's weapon systems to function in a variety of stockpile-to-target environments. The drop shapes are released as part of the Nuclear Weapon Retardation Device Test Program. Tests also verify the continuing compatibility between DOE and DOD subsystems. (Maj George Whipple, DOOV)

DIRECTORATE OF TRAINING–COLONEL JOHN J. DORAN, JR.

NEW SCORING CRITERIA FOR ORI/BUY NONE. B-52D units recently completed ORI/BUY NONE exercises which included evaluation of their contingency capability. Additional areas scored were cell tactics, cell refueling, and high altitude synchronous evasive action bombing tactics. This marks the first time these units were evaluated on this phase of their mission. In addition, beginning 1 August all SAC bomber units will be scored using Damage Expectancy (DE) criteria. DE for each sortie will be computed using: (1) Prelaunch Survivability (PLS), (2) Weapon System Reliability (WSR), (3) Probability to Penetrate (PTP), and (4) Probability of Damage (PD). This new criteria is designed to provide a more accurate evaluation of a unit's capability to perform its assigned mission. For more information on the new scoring criteria consult SACR 50-5, Vol I, 15 June 1979, and Vol II (S), 29 June 1979. (Lt Col Dick Trowbridge, DOTN)

OPS SYSTEMS MANAGEMENT. The process of MARs and 781s, from panel to posting, is becoming more timely and error free as a result of the Operations Systems Management (OSM) school held at HQ SAC in Apr 79. OSM personnel from all SAC flying units attended the course. The payoff has been a better trained, smoother running OSM shop and more efficient DOTT scheduling process. (Lt Col Chuck Hart, DOTF)

B-52/KC-135 WEAPON SYSTEM TRAINER (WST) IN-PLANT TESTING. Boeing Wichita Company, Wichita, Kansas, and Singer Company — Link Division, Binghamton, NY, are developing a B-52 and KC-135 WST. This month, eight B-52 and eight KC-135 aircrews will participate in the start of in-plant testing of the WST. This testing is part of the source selection process that will determine the winning contractor. The eventual winner of the competition will build B-52 WSTs at each operational unit. (Maj Dick Allen, DOTP)

DIRECTORATE OF TANKER OPERATIONS–COLONEL JOE H. SNOW

HQ SAC/DOK. On 1 July 1979, SAC's Single Manager Tanker Division was elevated to the directorate level. The new directorate is the single point of contact for all tanker operational matters. As such, it is responsible for the daily planning, coordinating and assignment of tanker resources to meet SAC/lateral command user requirements; monitoring implementation and making timely flexible adjustments; planning and supporting worldwide contingency scenarios and providing real time sortie/flying hour consumption information to all users. During the 1978 senate appropriations hearings for the advanced tanker cargo aircraft (ATCA), General David C. Jones, then the Air Force Chief of Staff said, "Currently programmed mission requirements are about 3 times greater than those for which the KC-135 force was procured. When the KC-135 force was originally sized to support Air Force refueling requirements, less than 10% (2030) of all aircraft were air refueling capable. In comparison the USAF force structure planned for 1982 more than doubles this total number of refuelable aircraft (4373). We have, in short, competing requirements for a limited refueling resource." Today, approximately one-half of all air refuelings are in support of lateral commands and tanker resources are periodically tasked to near maximum capability. Elevating tanker operations to the directorate level is the foundation upon which we can increase the management efficiency of the single manager concept and improve long range air refueling planning. (Maj Herb Lubin, DOK)

OPS UP DATE
DIRECTORATE OF STRATEGIC RECONNAISSANCE CENTER—COLONEL HARLON A. HAIN

another way to spell RECCE

Lt Col Bob Park

For nearly twenty-five years now, the high-flying U-2 has plied the skies doing a variety of jobs, some exciting and glamorous and some routine. The mystique of this unique aircraft has often been accentuated by book articles and news stories that refer to the "Black Spy Plane," invoking a sinister cloak of secrecy about everything the U-2 does.

The history of this magnificent airplane is long and proud. True, the U-2 was conceived to collect intelligence data from 13 miles up, and does this extremely well. Yet, there is another mission in which the U-2 excels. More and more, SAC's U-2's are being called upon to assist MAC's Aerospace Rescue and Recovery Service and the U.S. Coast Guard in massive search efforts for lost aircraft and ships. One of the most telling accounts of the U-2's success in this lifesaving role was a search attempt for a lost sailboat in late 1976.

On 12 September, the SPIRIT, a 42-foot ketch with a crew of five departed Honolulu, Hawaii for its home port near San Francisco. The voyage was planned to take about three weeks with position reports scheduled for each Wednesday. The only report received was on 22 September. On 14 October, ten days after the boat's scheduled arrival, its owner notified the Coast Guard that the crew may have run into trouble. He thought the ketch had lost auxiliary power and was unable to radio either progress or distress. Shortly thereafter, the Coast Guard issued a broadcast to all ships in the area that the sailboat was overdue.

Four days later, on 18 October, a freighter reported it had recovered two survivors of the sailboat from their life raft. After regaining their strength the survivors revealed the sailboat had struck a submerged object on the morning of 27 Sep and sunk in heavy seas. The crew deployed and boarded two inflatable life rafts only managing to salvage some fresh water, signalling equipment, and foul weather gear from the sinking boat. Although they had tied the rafts together, that night, a wave separated the rafts and they rapidly drifted apart.

With this information in hand, an intensive search for the other raft was planned for the first light on the 19th. A search area was developed based on probable drift from the last known position of the rafts when they were lashed together. Aircraft from the Air Force, Coast Guard, and Navy, as well as ships in the area, began scanning the sea for the small, six-man raft with its three occupants. Approximately 20,000 square miles of ocean were searched before nightfall, but to no avail. The next day's search was planned to cover a larger area with more aircraft.

The search on the 20th brought revived hope when one of the search aircraft reported sighting a raft. This hope soon faded when a ship that went to investigate found it to be the abandoned raft of the recovered crew members.

Worsening weather was beginning to move into the search area. Rain showers were lowering the ceiling and visibility, hindering the aircraft, but by dusk over 29,000 square miles had been scanned — still no success. An updated and refined search area was planned for 21 October. Additional aircraft were to be added to the force to cover an area of 32,000 square miles in hopes of finding the raft. Each day's unsuccessful search effort brought tremendous frustration, but everyone involved became that much more determined.

At this point, the Coast Guard felt that high altitude photography might provide the needed clue to the raft's location. SAC's Strategic Reconnaissance Center was asked to provide a U-2 to photograph the search area planned for 22 October.

After approval had been received, a call was made to the 9th Strategic Reconnaissance Wing at Beale Air Force Base, California, home of SAC's U-2 fleet. If the weather in the search area looked good, they were to launch a U-2 to cover 57,600 square miles of the Pacific Ocean. Just maybe, the U-Bird might photograph the elusive life raft and its occupants.

On the morning of 22 October, weather forecasters offered some hope for good conditions in the search area. Well before sunup, the ground crew began readying the aircraft and camera. Major Dave Hahn of the 99th Strategic Reconnaissance Squadron, donned his high altitude pressure suit and prepared for the long, lonely mission over the Pacific.

As the California coast slipped behind the climbing U-2, fifteen other aircraft and a Navy surface ship were already in the search area. Again, the search planes crisscrossed miles of trackless sea until they ran out of daylight. High overhead meanwhile, Major Hahn was flying a series of long photo runs; the camera recording everything below.

With his film supply exhausted, Major Hahn headed back to homeplate to begin the second phase of the search effort; photo interpretation. After landing at Beale, teams of photo processors quickly downloaded the camera, processed the film, and began a long night of tedious scrutiny with photo interpreters hoping to find some trace of the tiny raft. Planners had recommended using color film for this mission (black and white is standard).

This proved to be a wise choice. As the photos of mile after mile of sea and cloud passed over the light table, optimism began to wane. Just one of those clouds could hide the raft and the whole mission would have been fruitless.

Then suddenly, there it was — a tiny speck of orange against a sea of blue green, an image on film of less than 1/10,000 of an inch in diameter. To the untrained eye, the life raft was undetectable but the trained photo interpreter spotted it instantly. Considering the glint from the sun reflecting off the waves, clouds covering large areas of the surface, and white caps obscuring much of the film, was it luck or was it twenty-five years of professional experience dedicated that night to locating three lost souls on a life raft?

Early on the morning of 23 October, the Rescue Coordination Center was advised of the "find" and its position. The search forces were assigned a 34,300 square mile area while a Coast Guard cutter and one aircraft concentrated on the probable position of the orange dot. Once again, the day's effort was unsuccessful, but the search was not over by any means. The plan for the following day called for an even more intensive search.

On 24 October the Coast Guard cutter placed electronic marker buoys in the water near where the raft was supposed to be when sighted by the U-2. Tracking the buoys would provide the drift and probable position of the raft. The weather continued to be favorable for airborne searching and the first aircraft arrived on the scene at 1000. The planes again crisscrossed back and forth over the area where the raft was presumed to be.

At 1205, a Coast Guard HC-130 radioed the news all had been anxiously waiting for — the raft had been located! Of the three crew members that had been aboard, only one had survived. Against extreme odds, he subsisted for twenty-eight days in the tiny raft with little, if any food and small amounts of fresh water collected from rain showers.

Many elements contributed to the miraculous success of this massive search and rescue operation. Numerous hours were flown with eyes scanning endless expanses of ocean. Although the U-2 was credited with the "find" that led to the successful conclusion of this dramatic rescue, the real credit goes to the men and women of the 9SRW who made it all happen.

CFIC Corner

SECONDS TO LIVE

Major Nick Stevens
CFIC B-52 Branch Chief
Castle AFB, CA

We hope by now everyone has had a chance to see the latest Hanger Flying tape called *"Seconds to Live."* It deals with the loss of outboard engines on the B-52 during takeoff and as you probably guessed, corresponds to similar problems encountered on a recent accident. In fact, there have been numerous military and civilian accidents over the years related to the same thing. Also, there have been many successful flyouts. The techniques used on those flyouts helped provide the basis for the techniques and demonstrations presented in the video tape. In this sense, *"Seconds to Live"* depicts something someone did right and not necessarily the mishaps we usually hear about.

Three main points are presented to counteract outboard engine failure:

- Be mentally prepared for the engines to fail.
- Know how to control yaw, roll, and pitch.
- Know how to accelerate the airplane and get vital airspeed.

In this article we would like to review these points and discuss the techniques associated with each of them.

At CFIC, we take special pride in attempting to know what the airplane will do given a particular situation. In *"Seconds to Live,"* Major Gene Ware demonstrated this in a simulator sequence with his instructor candidates. This same training is received by all of our instructor candidates. Basically, it is a stop-start breakdown of what the airplane will do after experiencing a dual outboard engine failure if the pilots did nothing (or the wrong things). Obviously, it will crash, but the important thing demonstrated in the trainer is that it will crash in an entirely predictable and sequential way. After the outboard engines fail, yaw will occur. Yaw induces roll which will be the real eye catcher on the gauges. Next, as the airplane becomes airborne, pitch-up develops. This is caused by the exit from ground effect, gear retraction, rapid spoiler input, and possible fuel shift. To counter this pitch-up tendency, the pilot must react with elevator and nose down trim. The overall result of pitch-up is a degradation to airspeed and *without airspeed we will be unable to control the airplane.*

The secret of flying the airplane out of outboard engine failures on takeoff is attaining a safe airspeed. Nothing is more vital to controlling the airplane. So how do we do this? The first step is having the right frame of mind. This includes having the confidence and determination that it can be done.

Mental Preparation. Sounds a little heavy, but this is the key to the whole thing, and the simulator proves it. For years we have observed that if we fail outboard engines slightly below unstick and we catch the pilots by surprise, over 50% crash. Given a little time for thought and the opportunity to try again (not necessarily in the first sequence) and the same pilots will invariably fly out of it the second time. Failing the water on one side (G model) and two engines and we are seeing a 95% crash rate. A short prebrief and mental preparation is yielding a 100% fly out with the same conditions. How many times have each of us made a takeoff 70 knots behind the airplane? I think the aircraft can get a little tired of that after a while.

Part of being mentally prepared is knowing what to do and what is important. The easiest way to get behind an airplane is being confused about what is happening and forgetting to fly the machine. Uncertainty about procedures, what the other guy is doing, or whether the crab is set right are distractions that can leave us sitting on the ramp while the airplane takes off. The fact is, we only have a few seconds to react correctly when those outboard engines fail. I don't think there are many times other than a dual engine failure on takeoff that a B-52 pilot must act with such urgency. **It will happen!**

Being mentally prepared is having both pilots fine tuned to the procedures, techniques, and conversations that accompany the takeoff. Knowing where the hand (and feet) are and also those of the other pilot is extremely important. In a way, we think with our hands in an airplane. Trying to figure out where the hands are supposed to go when something happens is a pure waste of brain power. A friend of mine once related an experience he had during the war. On one takeoff he realized at about 100 KIAS that he had forgotten to open crossfeed #12 (D model). Being a rather harrassed copilot due to several recent screw-ups, he didn't want to get caught on this one — and proceeded to grab the wrong switch (waifer on D) and turned off Engine Fuel Feed Valve #16. Needless to say those guys were about to become very proficient with dual outboard engine failure on takeoff — which they did!

Guarding the throttles is a technique as opposed to a procedure. I mean, in the way we do it. A good way includes being certain who is to control them or when they will be retarded in an abort attempt. It can get real sporty when one pilot is trying to fly and the other is trying to abort. Placement of hands and use of throttle friction are things to consider when you prebrief throttle control with the other pilot.

Seat position. We would all probably like to know who designed the seats in our airplane so we could express to them our appreciation for such comfort. Nevertheless, we had better place those seats and rudder pedals where we can get max leverage. It's strange, but I feel most comfortable on takeoff (and landings and refueling) in the most uncomfortable position. For us duck butts, I would recommend full forward with most tilt out and at least "M" on rudder position. Whatever seat position suits us, it must be one in which we can apply full rudder and forward column.

Controlling Yaw. The first place to develop good habits controlling yaw is with taxiing. STAY ON CENTERLINE — LIVE ON CENTERLINE. We should never be satisfied with sloppy taxi habits that place the airplane left or right of centerline with no apparent attempt to correct. In this case, think feet. The objective here is to develop a habit of constantly correcting to centerline so that on all takeoffs and landings we are naturally tracking centerline without much mental effort — kinda like flying, anyway. If we can do this we will have trained ourselves to instinctively correct for yaw if those outboard engines fail. Since yaw will be a deviation from centerline, we will naturally correct. In this way we really don't care about which engines have failed and which rudder to apply. You can see how important this is when you remember it takes a heck of a lot less pilot input to keep the airplane going straight than it does to get it back after it started to yaw.

Correcting Roll. Many of us are reluctant to use rudder these days and we tend to maintain directional control with wheel only. If we are slow to correct yaw with rudder the next thing we will see is roll which we will probably try to correct with wheel — but it will be too late by then. So, it should suffice to say that yaw will cause roll and the way to control yaw is rudder. Lateral control is necessary, of course, but it will be much more effective if used with rudder. One last thing to mention here is that it is extremely important to continue to track centerline (or heading) after airborne, and a good technique when VFR is simply to pick a ground reference and track it along with your instrument crosscheck. THINK FEET . . .

Gene Ware talked about a "grey area" and we should not be afraid to address it. There may be a time when we cannot regain directional control without retarding the opposite outboard engine(s). Things to remember: inboard engines and symmetrical engines are your friends, be decisive about commiting the takeoff and aborts above S-1, and use all the runway if necessary to obtain flying airspeed once directional control is reestablished — THIS INCLUDES THE OVERRUN.

This brings us to the essence of solving our problem — our good buddy — AIRSPEED. Enough cannot be said about the virtues of safe airspeed — airspeeds well above a stall — airspeeds that give us

Continued on Page 30

ACE TOPICS

Capt Mike Mastromichalis
Lt Fred Lange
319 BMW

We were on a T-38 midweek cross country. It was great, as usual; the ACE program is the best flying in the Air Force. Nowhere can you get the experience making decisions you can in ACE, since you are an aircraft commander, scheduler and command post all rolled into one.

We had taken off from Hill AFB with the pitot heat ON since there was an overcast layer at about 10,000 feet. As we approached the clouds I elected to turn the engine anti-ice ON although ice was not forecast. Anti-ice is free, but it must be used with discretion. As we passed FL 260 the Mach continued to increase until it approached 1.0; at that time I pulled the power back a little. Still the Mach continued to increase up to 1.2. This of course is impossible for a T-38 in a climb, so I requested a level-off at FL 300 and pulled the power to 92%. The Mach read 1.2 and the indicated 200 KIAS.

We concluded after changing the power setting several times with no change in airspeed that we had lost all airspeed indications. We then set our fuel flow to what we had flight planned for and requested our ground speed readout from ARTCC. The ground speed was within 15 knots of flight planned so we were not afraid of stalling. We then cycled the pitot heat switch several times and turned the anti-ice off. This had no affect on our airspeed indications.

The angle of attack indicator was checked and it was operable. The AOA can be invaluable for situations such as this if you understand what it can do for you. In level flight the .18 index will give you maximum range and the .3 index will give you maximum endurance. By varying your fuel flow you can achieve on your AOA whichever index you want to hold. In our situation we flew max range (.18 index). This worked for about 15 minutes then our AOA failed. At this point we had to rely on fuel flow, RPM, and ground speed readouts from ARTCC.

As we approached Ellsworth AFB, our planned destination, we contacted their ACE Detachment Commander. He had already been notified of our problem, and there were two IP's waiting in a T-38 to crank engines and come up to get us. We obtained a radius clearance around the Rapid City Vortac and maintained level flight at FL 300. Approach control vectored the chase T-38 close enough to perform a visual join-up. We followed lead down and set up for a straight-in full stop with lead going around when we were over the overrun. An uneventful full stop landing was made with a sigh of relief.

There are some valuable lessons to be learned from this. Needless to say you have to know your systems. The T-38 dash one does not address loss of airspeed in flight; therefore think about what you would do if this had happened to you. It is good judgment to recover where there are similar aircraft available for chase aircraft. This applies to any aircraft. I doubt if we could have made a penetration through weather, approach, and landing without the chase T-38. This is why we elected to continue on to Ellsworth instead of staying at Hill.

ACE, as I said, is the best program for flying in the Air Force. Learn from it and you will be a much better pilot.

OPS HAZARDS

HEED THE WARNINGS

Engine damage and failure can occur during any phase of aircraft operation. In some instances the crew may not receive an indication of abnormal engine operation. Visible damage in these instances is usually discovered during the postflight inspection. However, in many cases, information is available to the crew to indicate a potential engine/engine related problem. This information is normally in the form of abnormal engine instrument readings, fire warning lights or compressor stalls/torching. If any of the above indications occur you are being told something is wrong. It may only be a minor problem at that point, but if left uncorrected, it could develop into a costly mishap. If the indication occurs on the ground, the deficiency should be corrected prior to flight.

If the indication occurs in-flight, appropriate emergency procedures must be complied with. Which procedures depends on the nature of the problem; shutting down the engine or aborting the mission are always possible actions. In any case, do not operate the engine at a power setting higher than that required for safe flight. Two mishaps which occurred this year show what can happen.

In the first mishap, a Class A, the aircraft had a history of torching and should never have left the ground. However, the crew elected to take off and all was well until the number seven engine was advanced for an engine conditioning monitor check. At this time the engine failed and resultant damage caused the engine to depart the aircraft.

In the second mishap, a Class B, the pilot was initiating an engine conditioning monitoring check when he experienced a compressor stall on number one engine. He retarded the throttle and all seemed normal so he readvanced the engine to complete the check. Shortly, thereafter, number one engine failed, causing extensive secondary damage.

In each of the above cases the engine had indicated to the pilot that something was wrong. Why push your luck to reaffirm a condition you already have reason to suspect? In these mishaps the higher power setting caused much more severe damage than would have been the case at a lower setting.

It is acknowledged there will be times when precautions are taken when the indications experienced are not a prelude to impending system failure. However, we probably will not know this until we are safely on the ground. In the following mishaps the crews experienced identical indications and followed tech data procedures. In the first instance further damage would not have occurred if the indications were ignored. In the second, potential catastrophic damage was averted.

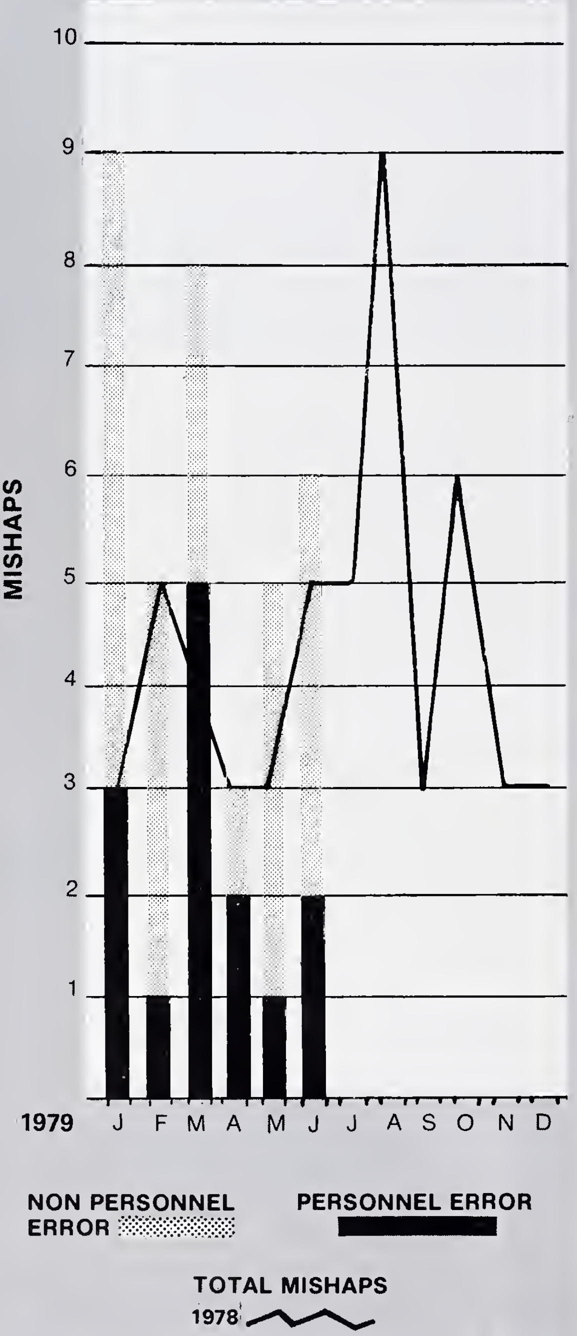
In the first mishap, a Class C, number seven engine was shut down for a fire warning light. Shortly afterwards the fire light came back on and the throttle for number eight engine was retarded to idle. The light went out and number eight engine was then shut down. This was in accordance with guidance contained in the dash one as the crew had reason to suspect a common bleed air leak. Postflight maintenance found the source of the problem was a fire warning indicator which was grounding out.

In the second mishap, a Class C, number eight engine firelight illuminated. The engine was shut down but the firelight remained illuminated. The number seven engine was retarded to idle. The light went out and the number seven engine was then shut down. Again this was in accordance with guidance contained in the dash one, but in this case there was a bleed air leak common to both engines. If the crew had elected to ignore the light after number eight engine was shut down, extensive and perhaps catastrophic damage could have been the result. This has been the case in some of our past mishaps.

Each year we incur many thousands of dollars in additional damage because crews did not heed failure warning signs. Whether the mission is aborted or not rests upon crew judgment combined with guidance provided by command/control. However, if equipment gives signs of malfunctioning, reduce demands placed on it to the extent safe flight can be maintained within the operational requirements deemed essential. — Capt Ross W. Phillippe, IGFF.

Missile Mishap Report

DOD CLASS A, B and C



PETTIBONE CRANE BACKLASH

A Pettibone crane, that had been used for the removal of a TITAN II missile, was being reconfigured for transport. The technician operating the crane was retracting the main winch cable when it backlashed and caught between the winch cable drum and the drum housing. Not detecting the backlash, he allowed the continued retraction of the cable. The cable was damaged and required replacement. To avoid damage to equipment being hoisted and damage to the crane itself, crane operators must be alert at all times to the safe operation of their equipment.

BENT PINS AGAIN

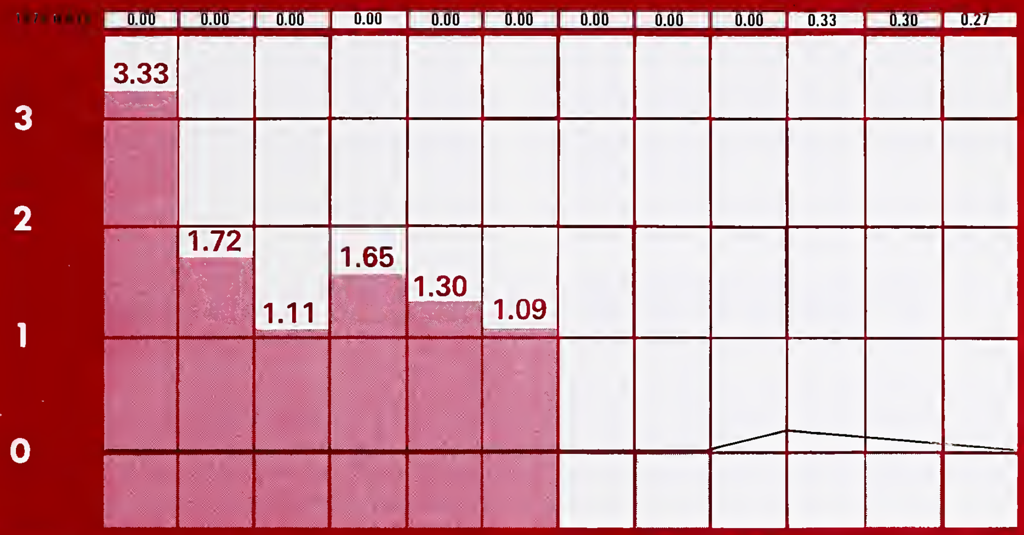
Personnel error while installing a shorting plug in a ballistic gas generator cartridge resulted in bent pins and rejection of the gas generator cartridge. Bent pins in electrical connectors due to improper keyway alignment and improper inspection of connectors prior to connection, continue to be the main causes of rejected electrical cables and components. Supervisors, technicians, and training personnel should continue to stress the importance of making correct cable connections.

HAND LINEAR ACTUATOR FAILURE

A missile maintenance team was attempting to lower a work cage motor down the personnel access hatch using the Davis hoist. As the lowering was about to begin, the primary door, together with the hoist which was mounted to it, began to fall closed. The door struck the top of the J-ladder and the work cage motor fell to the bottom of the personnel access shaft. Investigation revealed an apparent internal failure of the hand linear actuator. MIP OOIMM 790039 is established to investigate the problem with the linear actuator. Additionally, an AFTO 22 was submitted to change TO 21M-LGM30G-2-10 making the use of a primary door restraint mandatory and to include a warning note on the hazards of the door falling shut.

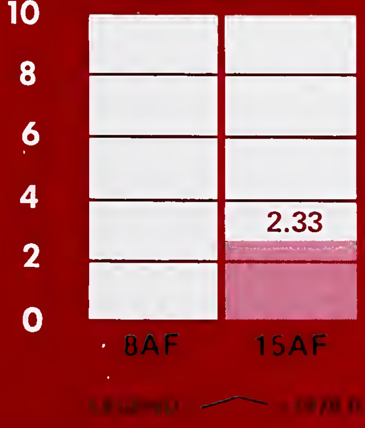
1979 Flying Safety Rate

SAC CLASS A MISHAP RATE (PER 100,000 FLYING HRS)



MISHAPS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1978	0	0	0	0	0	0	0	0	0	1	0	0
1979	1	0	0	1	0	0	0					

1979 SUBORDINATE CMD RATES



MISHAP STATUS

B-52H KC - 135Q	JAN 79 APR 79

r&d corner

HQ/SAC — DIRECTORATE OF AERONAUTICAL REQUIREMENTS

B-52 ECM UPDATE

Major James R. Costello
Chief, Defensive Systems Branch
Avionics Division, DCS/Plans

This month the R&D Corner looks at modification programs that will have a large impact on the defensive capabilities of B-52G/H aircraft. One program is the ALT-28 Transmitter Improvement and another is the B-52 Power Management System that is nomenclatured AN/ALQ-155(V). Since both of these modification programs are closely related, it is appropriate to consider them together. Modification of B-52G/H aircraft started in June 1979 and both programs will be completed by April 1984.

The ALT-28 Transmitter Improvement program provides for the replacement of ALT-6B transmitters with an equal number of ALT-28 transmitters. This replacement effort also provides for a redesign of the electronic warfare officer's (EWO) console. The two new ALT-28 transmitters will be located under the ALR-20A receiver. This results in a ten ALT-28 transmitter upload. This effort coincides with the ongoing program to put three Control Indicator Panels (CIP) in B-52G/H aircraft in order to improve the man/machine interface. The replacement and removal of outdated ALT-6B jammers permits the relocation of ALT-32s and the ALQ-122 (ALT-16As) jamming system in the space vacated by the ALT-6Bs and ALT-28 programmer. This relocation will enhance the control and monitoring of these jamming assets, plus it provides space for additional systems if required. As you can see, not only does this program provide an improved jamming capability, it also modernizes the EWO's console.

The other phase of this dual modification effort is the B-52G/H Power Management System. This program converts existing ALT-28 transmitters into an automatic jamming system. Threat information is provided by the ALR-46(V) radar warning receiver to the ALQ-155 (V) processor that controls the ALT-28 transmitters under the interaction and direction of the EWO.

The ALQ-155(V) has three modes of operation: automatic, semiautomatic, and manual. In the automatic mode the ALR-46(V) identifies the highest priority threat and relays this data to the ALQ-155(V). When the EWO determines it appropriate, he designates an ALT-28 transmitter to counter the threat. The processor locks on to the threat signal's center frequency, selects the correct jamming technique, and then maintains centering. In the semiautomatic mode of operation the EWO uses the ALR-20A to set an ALT-28 transmitter on a threat signal and the ALQ-155(V) processor maintains centering. The manual mode of operation is the same as the present ALT-28's capability. An end-to-end test of the ALQ-155(V) is provided by a built-in-test (BIT) like the ALQ-117's. Included in the BIT is a detailed malfunction analysis that will assist maintenance personnel in analyzing malfunctions plus a switch-coding matrix that informs the EWO what modes of the system are operational in case of a malfunction. Another aspect of this modification is an automatic interface and blanking routine with the ALQ-117 countermeasure system.

Another modification effort that is presently underway is the ECP-11 update to the ALR-46(V)1. This ECP converts ALR-46(V)1s in B-52G/H aircraft into ALR-46(V)4s. Not only does this modification improve the capabilities of the ALR-46(V) radar warning receiver, it also enhances the interface between the ALQ-155(V) power management system. The ECP provides for three threat identification tables that the EWO can select, depending on the tactical situation. Another aspect of this tactical flexibility is the incorporation of a high/low altitude capability. By being able to select the right altitude and the appropriate threat identification table, some of the ambiguities associated with the present configuration will be eliminated. Also included in this modification effort is the incorporation of new push-button switches and switch edge lighting. This will ease the selection of the various modes of operation and prevent confusion in operating the ALR-46's switches. This modification, started in January 1979, will be completed within 18 months.

So far we have not said anything about the B-52D. The APR-25 receiver will be replaced by the ALR-46(V)8 radar warning receiver. The ALR-46(V)8 has the same capabilities as previously described for the ALR-46(V)4. The primary difference between the ALR-46(V)4 and ALR-46(V)8 is the processor controlling the system. The B-52Ds will be modified beginning in June 1979, and it will take approximately two years to complete aircraft retrofit.

In order to indicate that there can be more than one version of a particular system, a (V) number is used in the nomenclature. This is particularly true with EW reprogrammable systems. Any time there is a change to the system's hardware or software, a new (V) number is introduced. This enables SAC to maintain configuration control of its reprogrammable systems plus indicate to a crewmember what the capabilities of a particular version are.

So far we have been talking about systems that will be coming into the inventory in the near future. A system that will be entering the inventory in late 1980 will be the B-52G/H Tail Warning System, nomenclatured AN/ALQ-153(V). Not only will this system provide a warning and indication of air-to-air missiles in the aft hemisphere, it also provides automatic dispensing of expendables. This will help conserve vital resources and optimize fighter tactics.

ECM systems that will be coming of age in the mid-1980s for B-52G/H aircraft are the Electronically Steerable Antenna System (ESAS) and the AN/ALQ-117 countermeasures system update. ESAS provides for the replacement of the presently installed ALT-28 omni-directional antennas with a highly directional phased array antenna system. This system will determine a threat's location and then direct the output of the ALQ-155(V) power management system at the threat. The ALQ-155(V)'s effective radiated power (ERP) will be increased because the jamming energy will be concentrated in a narrow jamming beam. The ALQ-117 update program will make the system reprogrammable and improve its ECM technique generation capability. Both of these programs are under full-scale development. Flight testing will take place in late 1981 or 1982, and a production decision is expected in 1983 for both systems. This means that aircraft retrofit could begin in 1985.

Another program under consideration is the Integrated Defensive System (IDS). This program is still in the conceptional stage, but requirements are being defined. The intent of this program is to develop a fully integrated ECM system using present equipment when possible and adding new systems when required. This building-block approach has proven to be successful in the past and has been the means by which many of the ongoing modification efforts came into being. Future articles will describe this system in more detail.

Obviously, a great deal has been left unsaid of these systems for security reasons. However, for those desiring additional information, recommend that you read some of the IOT&E reports that are available at the wing's Penetration Aids Office. Also, the Aerospace Medical Research Laboratory (AMRL) study, Human Engineering Report, 1977 Configuration, on the B-52 EWO crew console is available as well.

BUSINESS EFFORT

How many times have you wished that you could "shoot the bull" with the fighter pilot that you just refueled? Perhaps, some of you frustrated fighter jocks have wondered what a refueling looks like from the other end of the boom. A program does exist to give tanker crewmembers an opportunity to discuss air refueling techniques with fighter units and get orientation flights in a "go-fast" machine. This program is nicknamed BUSINESS EFFORT and it is covered in Frag Order 1 to SAC Operations Order 16-78.

Business Effort authorizes visits by tanker aircrews and aircraft to bases of other commands to conduct joint orientation briefings, air refuelings, post-mission critiques, and orientation flights. These exercises expose the receiver units to SAC refueling techniques and procedures. The visits apply primarily to fighter units that require such exposure for initial qualification training in air refueling, e.g. Combat Crew Training Wings and Replacement Training Units. However, Business Effort is also applicable to units where the quality of air refueling operations could be improved through these orientation visits. Not only will the fighter units gain from BUSINESS EFFORT exercises, but the tanker aircrews can gain excellent training from deploying to forward operating locations and conducting detached operations.

The 924th AREFS conducted its first Business Effort exercise recently. Capt J. Lewis Smith and crew E106 deployed to Davis-Monthan AFB with a normal training mission enroute. Besides the crew, 2 staff members, 3 crewchiefs and a maintenance supervisor went along to supervise the deployment and service the aircraft. At D-M, joint orientation briefings were conducted and on the second day several fighter pilots flew on the tanker to see an air refueling from the other side. The third day, the crew flew another mission refueling A-7s and A-10s, recovering back home at Castle.

The typical Business Effort visit is planned to last four days and we will conduct a visit every other month. TAC units that we will be visiting include the 27TFW at Cannon (F-111), the 35TFW at George (F-4 & F-105), the 58TFW at Luke (F-4 & F-15), and the 355TFW at Davis-Monthan (A-7 & A-10). When possible, tanker crewmembers will be given orientation flights in the host wing aircraft. Besides the orientation briefings, flights and post-mission critiques, there are also opportunities for informal sessions at the club.

There is much to be gained from the Business Effort exercises, both for the tanker and fighter units. The fighter wings can improve their understanding of air refueling operations through the orientation flights and direct contact with tanker crewmembers. In addition, rendezvous procedures can be improved, especially for the fighter units that refuel in anchors without radar control. These have historically been a problem area. Tanker and fighter crewmembers can see how "the other half" lives and works. This close contact with fighter units can give us a better understanding and appreciation of their requirements and capabilities.

Cost is always a consideration for an exercise and in this case there may actually be a savings. For maintenance, 4 sorties can be produced from 1 tanker after the initial generation at home station (the deployment flight, 2 round-robins at the host base, and the return flight). Thus, a savings in maintenance manhours can be realized since the aircraft is operated from the forward location. Flying time can also be conserved by operating out of the receiver's base instead of supporting them with sorties launched from home base. At Castle, approximately six flying hours can be saved during each BUSINESS EFFORT exercise. This savings is more than enough to offset the TDY expenses.

Capt Dennis E. Boyce
924 AREFS

PROFESSIONAL PERFORMERS

[illegible]

MAINTENANCE MAN

SSgt Paul E. Hargrove, 376SW, Kadena AB, is SAC Maintenance Airman of the Month. As aircraft crew chief and assistant flight chief in the RC-135M Strategic Reconnaissance Section, he displayed exceptional supervisory talent. He also supervises day to day maintenance actions on the RC-135s and insures that newly assigned personnel are properly trained on the uniqueness of these aircraft. His section was rated error free during a recent MSET visit. Sgt Hargrove also refurbished the unit's only waste disposal truck during his off-duty hours. He returned to service a piece of equipment that would have cost $17,000 to replace. Sgt Hargrove is a dedicated noncommissioned officer and a valuable asset to the SAC maintenance function.

MINUTEMAN CREW

Timely status analysis and an in-depth grasp of the weapon system by Crew R-078 resulted in minimal equipment damage to and prevented unnecessary degradation of an operational launch control center. While on alert at HOTEL LCC, Lt Gore detected acrid smoke, increasing in thickness and intensity, coming from the emergency air conditioning unit panel. Lts Gore and Croxall immediately responded by consulting their technical order and implementing the emergency fire checklist. The checklist directed that burning equipment be isolated in accordance with the LCC circuit protection chart. The fire location was determined to be in the heater modulator of the EACU. When the crew attempted to isolate the fire by using the circuit protection chart, they could find no entry for the heater modulator or the EACU panel itself. Realizing that something had to be done quickly due to the thickening smoke, the crew determined that the heater module was part of the capsule duct heating system, a fact not addressed in the TO. The crew informed job control of their determination and with their approval, pulled the circuit breaker to isolate the capsule duct heating system. The thick smoke quickly dissipated and the fire went out. This display of professionalism and weapon system knowledge, a knowledge that here extended beyond the confines of their TO, prevented possible LCC evacuation and shutdown due to the thick smoke. The achievements of this crew reflect their dedication and their accomplishments warrant selection as the Strategic Air Command Crew of the Month.

MINUTEMAN Crew R-078, 341st SMW, Malmstrom AFB: MCCC 1Lt Gary L. Croxall, and DMCCC 2Lt Gary J. Gore.

TITAN Crew R-120, 308th SMW, Little Rock AFB: MCCC Capt Kenneth B. Grove, DMCCC Capt James D. DeLoach, MSAT A1C Gregory J. Mirabelli, and MFT A1C Mark R. Leland.

TITAN CREW

Crew R-120 distinguished itself by being designated a highly qualified mission ready crew on their most recent standardization evaluation. As the senior missile combat crew at their assigned complex, Crew R-120's dedication and extra efforts resulted in their complex earning an excellent rating from the SAC IG evaluator during the SAC ORI in December 1978. The crewmembers received a letter of appreciation from the 308th SMW Deputy Commander for Operations for their outstanding contributions to the wing mission during the stringent no-notice evaluation. Additionally, their assigned complex was named the winner of the highly coveted Squadron Complex of the Month award in January 1979 and was rated completely error-free during the annual safety inspection conducted by the 308th SMW safety office.

Crew R-120 has also exemplified the highest degree of weapon system knowledge and crew coordination. Recently, while on alert, the crew was confronted with a toxic oxidizer reagent leak in the complex fixed vapor sensing equipment. The crewmembers rapidly and accurately performed all the time sensitive actions of the emergency checklist and safing procedures required to shut down the system. Their expedient actions minimized the amount of the toxic reagent that escaped into the silo equipment area and prevented a potentially dangerous situation at the complex. Their reaction under the pressure of this hazardous situation further reflects on their professionalism and expertise and warrants selection as Crew of the Month.

FLYING CREW

Crews E-04 and E-12, Eielson AFB, were flying a COBRA BALL mission in the Northern Pacific, when they received word that a Navy P-3 ditched at sea with 15 persons. The aircraft was diverted to the site, west of Shemya AFB, Alaska, to search for survivors. Enroute to the site, contact was established with a Navy P-3 rescue aircraft. COBRA BALL was first on the scene and initiated a low altitude circular search pattern. Visual attempts to sight the crew were hampered by rapidly descending clouds, haze and high seas caused by strong surface winds. The Navy P-3 was directed into the area by COBRA BALL, and a flare was sighted from the downed crew. On a second pass over the coordinates, a raft was sighted with survivors. With no established air refueling tracks in the vicinity of the ditching site, the Crew E-04 navigators, without prior mission planning or coordination with the tanker crew, constructed a refueling track in flight. Despite UHF communication problems, a quick and efficient air refueling was accomplished by the pilots. Without doubt the professional response of the crewmembers was directly responsible for the lifesaving mission.

Crew E-04 members are: Capt Clifford B. Carter, Capt Robert J. Rivas, Capt Bruce J. Savaglio, and Capt Gordon S. Alder. Crew E-12 members include: Capt Alan C. Feldkamp, Capt Robert D. Carlson, Capt Gregory W. Cummins, Capt Irving W. Irons III, 1Lt Richard H. Stotts, Capt Ronald E. Hood, 1Lt Bruce M. Carson, Capt Henry J. Lees, TSgt Thomas J. Youngblood, Jr., SSgt Dennis J. Grundhauser.

CFIC CORNER

Continued from Page 21

the ability to control the airplane even if other engines fail. You can lose control of a B-52 with one outboard engine down or you can fly the same aircraft nicely with four down on the same wing. The difference is *airspeed.* So, we must do things when engines fail on takeoff to obtain airspeed and we must nurse every knot of airspeed as it if were the only thing that mattered in life — which is quite true.

The first thing to do is use the runway including the overrun, if necessary. DO NOT HORSE THE AIRCRAFT INTO THE AIR. It will fly at substantially lower airspeeds than unstick but it may not be controllable at those airspeeds.

Control Pitch. As soon as the airplane has flying speed and wants to fly pitch is waiting for you. The airplane will want to pitch when it leaves the ground and we must control that tendency. We must keep the pitch to such low values that we fly a flat profile — even in ground effect if possible. As a rule, relieve backpressure soon after airborne so that we have the sensation our tail is rising above our heads and our trim requirements are nose down and consistent. (D folks will have to be a little careful about the drops). In any event, avoid pitch-up because it will decay airspeed.

Landing Gear. We can't do much more to reduce parasite drag on the airplane except raise the gear, and it's of no particular use to us if our intention is to fly. So raise the gear ASAP but remember it will also cause pitch up, but don't worry about that because all pitching tendencies we encounter are easy to control as long as we anticipate them. The main thing is to continue to fly a flat profile and use whatever power we have available to obtain airspeed. It's not even necessary to look at the airspeed meter — have the other pilot do that if it concerns you. Also, don't worry about what airspeed — just lots of it. The airplane tells us when the airspeed is right in the way it flies. We will feel the control forces lighten. We can even see the rudder come out and the wheel leveling as the airspeed increases. Then, as Gene puts it, "if catastrophe struck further we could trade that airspeed for altitude."

So that's about it . . . our secret is ATTAIN AIRSPEED and there's not much else to say except there are a lot of ones, twos, sevens, and eights out there ready to quit.

FLY THE AIRCRAFT

For additional information on this subject call Castle AFB, CFIC AUTOVON 347-2235 or Carswell AFB, CFIC 739-5216.

DEBRIEF

T-10 Lightning Strike

A series of thunderstorms passed over a SAC base with heavy lightning and wind gusts to 35 knots. Lightning strikes were confirmed in several areas. The first strikes did no damage but set off several alarms. Later strikes hit a power vault which housed a transformer. In addition, approximately $2,800 damage was done to a T-10 trainer, F-55 scanner and associated equipment. Fortunately there was no crew in the trainer — it never pays to fly in or near thunderstorms, even if you never get off the ground!

When You're Right, You're Right, Colonel!

"We all enjoyed "The Legacy" article in the June issue of Combat Crew. One sentence puzzled us. "The wing flying safety program received the only outstanding rating given to a flying safety program by the SAC Inspector General and followed it with another outstanding rating in 1979." The record shows that the 92BMW flying safety program was rated outstanding in 1978 and 1979, not to mention 1975, 1976 and 1977. The flying safety officers were Capt Gary R. Rockefeller, Capt Allan R. Jackman and Capt Thomas W. De Pue. I don't know if that is an all-time record, but it's not bad." —Col John A. Shaud, Commander, 92BMW.

Congratulations to the 92BMW people and their safety crew named above. It would appear we should now cover this outstanding Fairchild wing in Combat Crew — and soon too!

Hold That Letter

Paragraph three in Capt Adler's article on page two indicates SAC Safety Program is implemented by SAC Regulation 127-2. This will soon be replaced by SAC Sup 1 to AFR 127-2.

SAC SAFETY SCREEN

28 BMW, Ellsworth Crew R-11: P Capt William J. Patton, CP 1Lt Floyd D. Sawyer, Jr, RN Capt Charles E. McGrath, NN 1Lt James M. Daniels, EW 1Lt Bradley A. Moore, AG SSgt Boliver K. McNeal

55 SRW, Offutt Crew E-19: P Capt Gerald A. Hall, CP 1Lt James V. Queen, N1 Capt John W. Dennis, Jr, N2 1Lt Mark A. Lewis

92 BMW, Fairchild Crew E-10: P Capt Stephen H. Reich, CP 1Lt Michael S. Reese, RN Capt William H. Price, NN 1st Thomas G. Bowie, EW 1Lt Walter M. Jenkins, Jr, AG SSgt Craig A. Medvigy, IP Capt Richard K. Maier

96 BMW, Dyess Crew S-02: IP Capt William I. McClurg, Jr, ICP Capt Stephen R. Coleman, IB Capt Gary L. Clark, IN Capt Charles P. Williams, IE Capt John J. Tomich, IG Sgt Clarence D. George

100 AREFW, Beale Crew S-103: P Capt Robert L. Corley, CP 1Lt Bruce H. Swezy, NN Capt Carl J. Thornton, BO MSgt Anthony L. Bruno

319 BMW, Grand Forks Crew R-104: P Capt William J. Tupker, CP 1Lt Thomas M. Frank, NN Capt Michael G. Venaccio, BO SSgt Jean W. Federico

43 SW, Andersen Crew R-23: P Capt Donald A. Huston, CP Lt Col James R. Nerger, RN Capt John R. Miller, N 2Lt Gary A. Trogdon, EW 1Lt Jesus M. Jimenez, IN Capt Lynne C. Thompson, N Capt Leroy G. Barco

126 AREFW, Chicago O'Hare (ILANG): P Maj Stephen G. Hunter, CP Maj Kenneth N. Eldrup, N Capt James B. Jolly, BO TSgt Spero J. Melonides

44 SMW, Ellsworth Crew R-025: MCCC 1Lt David J. Powers, DMCCC 2Lt John A. Brown

90 SMW, F. E. Warren Crew R-155: MCCC 1Lt Herman E. Brandon, Jr, DMCCC 2Lt Donald R. Reed

91 SMW, Minot Crew R-002: MCCC Capt Phillip L. Scheuerman, DMCCC 2Lt Jimmie D. Walter

321 SMW, Grand Forks Crew R-141: MCCC 1Lt Mark A. Siegler, DMCCC 2Lt Eugene J. Smith

351 SMW, Whiteman R-085: MCCC 1Lt James Michael Reames, DMCCC 2Lt Stephen E. Gravitt

381 SMW, McConnell Crew E-194: MCCC Capt Christopher J. Pickell, DMCCC 2Lt David M. Costa, MSAT SrA Samuel P. Jordan II, MFT Sgt Raymond E. Stone

390 SMW, Davis-Monthan Crew S-100: MCCC 1Lt Carlos O. Cherry, DMCCC 1Lt Michael K. Kelly, MSAT MSgt Beryle M. Farmer, MFT SSgt Bruce E. Cook

The SAC Safety Screen is an honor roll of SAC's most professional crews. To gain listing on the Screen, crew members must be nominated by their unit commanders and meet high selection criteria of experience in their aircraft or missile system *IAW SACR 127-2.*

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UNIVERSITY OF FLORIDA
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HALL OF FAME

TACTICAL FLYING

OVER TWENTY-THREE YEARS

170 AREFG McGuire (NJANG)	Feb [illegible]

OVER TWENTY-ONE YEARS

171 AREFW Greater Pittsburgh (PAANG)	Mar 58
157 AREFG, Pease (NHANG)	Jun 58

OVER TWENTY YEARS

97 BMW Blytheville	Aug 58
910 AREFG, Mather (USAFR)	May 59

OVER NINETEEN YEARS

307 AREFG Travis	Sep 60

OVER EIGHTEEN YEARS

151 AREFG Salt Lake City (UTANG)	Feb 61
161 AREFG Sky Harbor (AZANG)	Apr 61
126 AREFW Chicago O Hare (ILANG)	Apr 61

OVER SEVENTEEN YEARS

134 AREFG McGhee Tyson (TNANG)	Aug 61
340 AREFG Altus	Feb 62
301 AREFW Rickenbacker	Jul 62

OVER SIXTEEN YEARS

96 BMW Dyess	Aug 62

OVER FIFTEEN YEARS

19 BMW Robins	Aug 63

OVER FOURTEEN YEARS

160 AREFG, Rickenbacker (OHANG)	Dec 64
320 BMW Mather	Jul [illegible]

OVER TWELVE YEARS

452 AREFW March (USAFR)	Sep 66
92 BMW Fairchild	• Feb 67
55 SRW Offutt	Jul 67

OVER ELEVEN YEARS

2 BMW Barksdale	Aug 67

OVER TEN YEARS

5 BMW, Minot	Feb [illegible]

OVER NINE YEARS

42 BMW Loring	Sep [illegible]
141 AREFW, Fairchild (WAANG)	Oct 69
28 BMW Ellsworth	May 70

OVER SEVEN YEARS

7 BMW, Carswell	Mar 71
101 AREFW, Bangor (MEANG)	Mar 72
416 BMW Griffis	May 72

OVER SIX YEARS

305 AREFW, Grissom	Aug 72
376 SW, Kadena	Nov 72
379 BMW Wurtsmith	Apr 73

OVER FIVE YEARS

931 AREFG, Grissom	Feb 74
384 AREFW McConnell	Mar 74
189 AREFG Little Rock (ARANG)	May 74

OVER FOUR YEARS

43 SW Andersen	Dec 74

ICBM

OVER FIFTEEN YEARS

90 SMW, F E Warren	Jul 64

OVER FOURTEEN YEARS

1 STRAD Vandenberg	Sep 64

OVER THIRTEEN YEARS

308 SMW Little Rock	Aug [illegible]

OVER NINE YEARS

341 SMW Malmstrom	Apr 70

OVER SIX YEARS

390 SMW Davis Monthan	Jul 73

OVER FOUR YEARS

351 SMW, Whiteman	Oct 74
91 SMW Minot	Nov 74

To gain listing in the Hall of Fame, a SAC or AF unit must be Class A [illegible] free for 48 months.